

# NATURAL HISTORY MISCELLANEA

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## A New Nematode (*Rictularia microti*) from a Vole on St. Lawrence Island, Alaska<sup>1</sup>

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The *Rictularia* parasitic in North American rodents are divisible into two groups, those with a transverse and dorsal oral opening, and those with a roughly circular and anterior oral opening (Tiner, 1948a). The first group contains a single species at present, *R. citelli* McCleod, 1933. The second group consists of *R. onychomys* Cuckler, 1939, *R. onadatrae* Chandler, 1941, *R. dipodomis* Tiner, 1948, and the *Rictularia* spp. of the "coloradensis" group. The species *R. coloradensis* Hall, 1916 is considered to be a parasite of its type host, the Colorado chipmunk, *Eutamias quadrivittatus*, and of *Peromyscus* spp. The writers consider that several additional species which are closely related to *R. coloradensis* occur in North America, and that maximum comb lengths, number of combs, and number of denticles are some of the characteristics that can be used to separate them into host-specific groups.

There are perhaps two undescribed species of *Rictularia* in rodents of the midwestern and eastern United States. They are parasites of tree squirrels and have a maximum comb length of 148-211  $\mu$ , or of wood rats and have a maximum comb length of 148-160 s or more (Tiner, 1948a). Their comb lengths make the worms from both of these hosts intermediate between *R. coloradensis* and *R. onychomys*. The number of denticles counted from side views of these undescribed forms was about 17, and consequently they seem more closely related to *R. coloradensis*.

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Observations on a series of *Rictularia* from St. Lawrence Island voles collected by Everett Schiller yielded a new species which also resembles *R. coloradensis*. This material was sent to the writers by Dr. Robert Rausch of the Arctic Health Research Center, U. S. Public Health Service, Anchorage, Alaska. Additional, similar specimens from the Alaskan mainland previously had been collected by Dr. Rausch. The new species can be distinguished by the number and maximum length of its pre-vulvar cuticular processes and also upon examination of *en face* views.

*Rictularia microti* n. sp.

*Female*. Length 11.2-27.8 mm.; maximum diameter anterior to vulva 334-465  $\mu$ , maximum diameter posterior to vulva 494-683  $\mu$ . Buccal cavity heavily sclerotized, external diameter at anterior end 52.2-88.0  $\mu$  at base 82.0-94.5  $\mu$ ; depth 61.9-78.3 s. Total number of denticles 24-25 (Fig. 4 and 5). Cervical papillae at subequal distances from anterior end. Nerve ring 334-479  $\mu$ , excretory pore 465-500  $\mu$ , right cervical papillae 508-610  $\mu$ , left cervical papilla 581-625  $\mu$ , k from anterior end. Oesophagus 2.9-3.5 mm. long, width at base 117-145  $\mu$ . Vulva 3.75-4.82 mm. from anterior end and always caudal to oesophagus. Total number of cuticular processes 64-66 pairs, including 17-20 pairs of combs, and 46-50 pairs of spines. Six to seven combs anterior to left cervical papilla, seven combs anterior to right cervical papilla. **Total** number of cuticular processes anterior to vulva 32-33 pairs, one pair at its level, and 31-33 pairs of spines posterior to vulva. Maximum length of combs 131-145  $\mu$ , maximum length of spines 150-160  $\mu$ . Distance of last spines from caudal extremity 465-683  $\mu$ . Tail 252-462  $\mu$ , long. Ova 39.1  $\mu$  x 22.8-29.1  $\mu$ .

*Male*. Length 4.7-9.5 mm.; maximum diameter in center third of body 261-537  $\mu$ . Buccal cavity heavily sclerotized. External diameter at anterior end 29.4-52.2  $\mu$ , depth 48.8-61.6  $\mu$ , width at base 42.3-71.7 s. Total number of denticles 26 (Fig. 7). Cervical papillae at subequal distances from anterior end. Nerve ring 407-552  $\mu$ , excretory pore 436-508  $\mu$ , right cervical papilla 552-697  $\mu$ , left cervical papillae 567-749  $\mu$  from anterior end. Oesophagus 1.4-2.2 mm. long; width at base 82-103 s. Total number of pairs of cuticular processes 45. Six to seven combs anterior to each cervical papilla; usually six combs anterior to excretory pore. Each row of cuticular processes contains: 30-37 combs, maximum lengths 131-147  $\mu$ ; 6-13 with posterior projections that closely resemble spines of female, maximum length of entire structure 160-179  $\mu$ ; 1 or 2 processes at posterior end of row on each side

more or less vestigial, lacking sharp posterior points characteristic of the rest (see Fig. 4, Tiner, 1948a, and Fig. 1, this paper). Cloaca 202-274  $\mu$ , from caudum. Spicules equal, slightly curved, and with irregular chitinization at tips (Fig. 1). Single pre-cloacal fan variable; 39.1-108  $\mu$  long x 9.8-29.5  $\mu$  high, or rudimentary, or absent. Two pairs of pre-cloacal papillae posterior to fan; one median on anterior lip of cloaca, and one pair of papillae lateral to cloaca; first three pairs of post-cloacal papillae close to median plane, behind these one pair of very lateral papillae, and then three pairs of small papillae. Single phasmid on each side of caudal extremity (Fig. 1).

Type host: *Microtus oeconomus innuitus* Merriam on St. Lawrence Island, Alaska. Other hosts: *Microtus miurus paneki* Rausch at Anaktuvuk Pass (Brooks Mountains), Alaska.

Location: Small Intestine.

Type locality: St. Lawrence Island, Alaska.

Type specimens: U. S. National Museum Helminthological Collection No. 47724.

The maximum comb lengths of *R. microti*, 131-145  $\mu$ , make it intermediate between *R. coloradensis* and *R. onychomys* with respect to this character. However, there is at least one more cuticular process anterior to the vulva than in any of the previously discussed *Rictularia* of the "coloradensis" group, or in *R. onychomys*: *R. microti* has 32-33 such cuticular processes, whereas these others have 29-31. By examining the tabulations of Dollfus and Desportes (1945) one can readily see that relatives of *R. coloradensis* had not been reported from abroad prior to 1945. *Rictularia dipodomis* is apparently the only species to be described subsequent to the appearance of the paper of Dollfus and Desportes, and this species is readily separable because it has 40 pairs of pre-vulvar combs.

Several species not included in the tabulation of Dollfus and Desportes (1945) were listed by Tiner (1948b) in order to separate them from *R. dipodomis*. Inclination of the oral opening or numbers of pairs of cuticular processes will serve to separate most of these from *R. microti*, but there are three species for which information of this sort is inadequate in the literature. These are *R. elegans* Travassos, 1928, and two species described by Galli-Valerio (1932), *R. vulpis* and *R. muris*. The maximum length of each sex of *R. elegans* was less than half the minimum lengths recorded in this paper for *R. microti*. The eggs pictured in the female by Travassos (1928) indicate that he had mature worms. Until there has been a survey of the parasitic nematodes of mammals in its type locality, Fully, Canton of Valais, Switzerland, *R. vulpis*

cannot be separated from any of the described species of *Rictularia*. Fortunately, the maximum measurements for length and width of our specimens (9.5 x .53 mm.) never equalled the dimensions given for *R. vulpis* (10 x 1 mm.). According to Galli-Valerio the male of *R. muris* has 10 denticles. The writers have counted 26 denticles in *R. microti* males. *Rictularia coloradensis* males from *Peromyscus* are known to have 12 denticles.

Reliable determination of North American *Rictularia* cannot yet be done on the basis of male specimens. In addition to the variation of male specimens from ground squirrels and chipmunks (Tiner 1948a), the writers have observed two male *R. coloradensis*, each with anterior and circular oral openings, from a single *Peromyscus leucopus* near Urbana, Illinois. One of these males had no pre-cloacal fans and equal spicules 238  $\mu$  long, whereas the *R. coloradensis* male described from the chipmunk by Hall (1916) had no fans, but a right spicule 145  $\mu$  long and a left one 180  $\mu$ . The other male appeared to be more slender and younger. It closely resembled the specimens in the redescription of *R. coloradensis* by Tiner (1948a) in that there were three pre-cloacal fans and short, unequal spicules. The right being 39  $\mu$  long and the left 88  $\mu$ . One would expect all the *Rictularia* in a single mouse of a small and isolated woodlot population to belong to a single species. The spicule lengths of the males of a species of parasitic nematodes are usually considered to be relatively constant, and very useful for classification. Evidently this constancy does not apply to *Rictularia*. The number of male specimens available to any single taxonomist is usually very small, and it will be quite a while before the extent of the variation of these can be worked out.

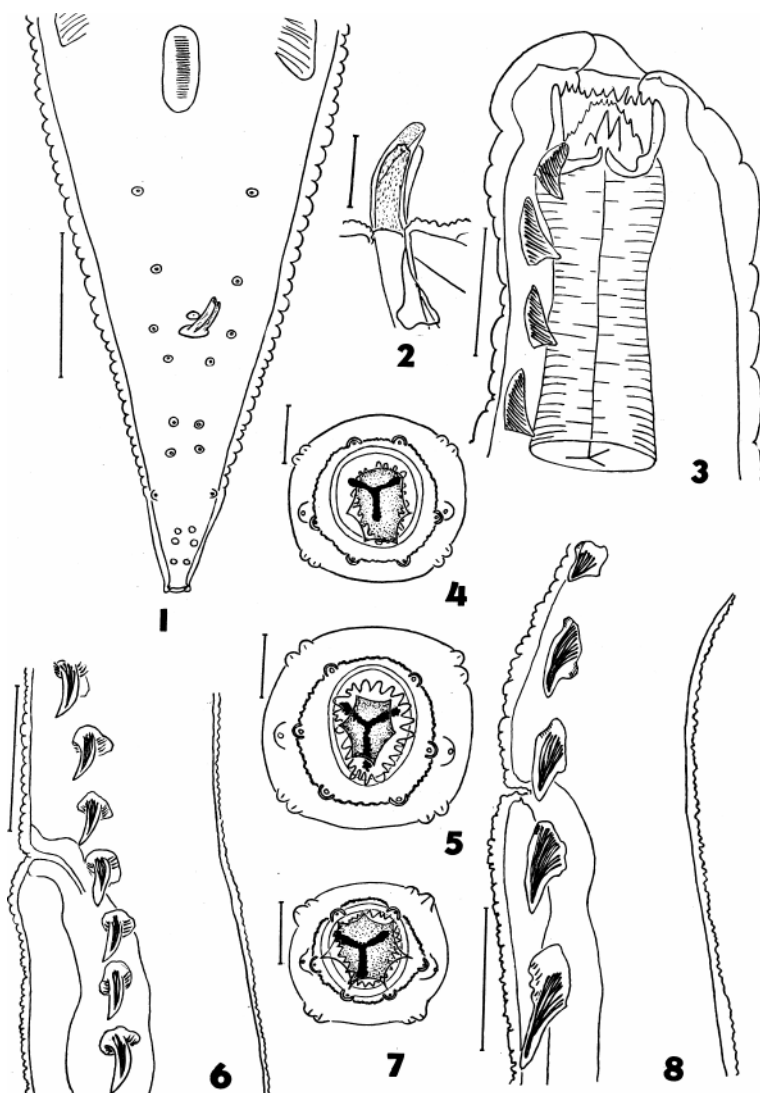
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Plate 1

Scales: Fig. 1, 6, 8 = 300  $\mu$ ; Fig. 2 = 20  $\mu$ ; Fig. 3 = 100  $\mu$   
Fig. 4, 5, 7 = 50  $\mu$ .

1. Ventral view of caudal region, male, *Rictularia microti*.
2. Tip of spicules, male, *R. microti*.
3. Lateral view of anterior end, female, *R. microti*.
4. *En face* view of mainland form, female, *R. microti*.
5. *En face* view of island form, female, *R. microti*.
6. Lateral view of vulvar region, female, *R. coloradensis*.
7. *En face* view, male, *R. microti*.
8. Lateral view of vulvar region, female, *R. microti*.

Plate 1



*Rictularia microti* is the first of those members of its genus which have an anterior oral opening and which are known to parasitize North American rodents in which the male caudal papillae have been located on an extended specimen (Fig. 1). The number of post-cloacal papillae equals that found by reconstruction from side views of *R. ondatrae*. There is one pair of papillae more than was found on extended specimens of *R. macdonaldi* or *R. citelli*. This additional pair of papillae is located just behind the cloaca.

The writers consider the morphology of the cuticular processes of *Rictularia* to be very useful for separation of species. With the possible exception of *R. proni* (see Dollfus and Desportes, 1945), insufficient attention has been given to their exact structure in either male or female specimens of any member of the genus. No adequate criteria for differentiating between combs and spines are available in the literature, especially when the transition of the former to the latter is gradual. The following method of distinguishing them may be of interest to future workers: striae in combs are separated at the edge and converge slightly in the free angle (Fig. 3) while those of spines converge toward the apex of the point (Fig. 8). Spines near the vulva of our *R. coloradensis* specimens differed very sharply from similarly located spines of *R. microti*. The striations of these structures in *R. coloradensis* leave the spines at their bases and extend outward for a short distance approximately parallel to the cuticular striations on either side of the spine (Fig. 6). The striations of *R. microti* are finer, and confined to the sides of the spines and to the crest anterior to its base (Fig. 8). This crest is lacking in *R. coloradensis*.

In general, specimens from *Microtus miurus paneki* were in agreement with the St. Lawrence Island males and females from *Microtus oeconomus innuitus*. However, the buccal cavity was circular in cross section in both sexes from the mainland (Figs. 4 and 7), whereas the stoma of the male from the island had a circular cross section and that of the female was roughly oval (Fig. 5). The long axis of this oval extended dorsoventrally. There were about 20 denticles in the members of each sex from the mainland. One male from the mainland had four pre-cloacal fans and spicules about 160  $\mu$  long. Two other males agreed with those from the island in that they lacked pre-cloacal fans.

A new distribution record was obtained for the *Rictularia* sp. in *Neotoma*. Merle Kuns sent one of the writers a slide containing a single female collected from *Neotoma magister* in Harrison County, Indiana, March 21, 1947. This specimen was mounted in glycerin jelly and had combs 148-211  $\mu$  long. In other respects the worm resembled *R. coloradensis*. None of the *Microtus* from the North Central States examined by Rausch (see Rausch and Tiner, 1949) were infected with *Rictularia*.

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